Warm Up:
If \( x \) is both the cube and the square of an integer and \( x \) is between 2 and 200, what is the value of \( x \)?

- a.) 8
- b.) 16
- c.) 64
- d.) 125
- e.) 169

What was the average for the chapter 6 test?

Let's start with a very simple example. My 5th hour is very small (not my class). There were only 4 people who took the chapter 6 test. Their scores were: 60, 70, 80, 90.

1.) Make a dotplot of the population distribution.

2.) Take a sample of any 2 of the scores. Find the mean of your sample.

3.) Figure out all of the possible samples of size 2. Calculate a sample mean for each sample of 2.
4.) Make a dotplot using each of the means you found in #3.

5.) What is the mean of the population? Label this on the dotplot above.

\[
\frac{100 + 70 + 80 + 90}{4} = \frac{340}{4} = 85
\]

<table>
<thead>
<tr>
<th>Statistic:</th>
<th>Parameter:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number that describes a sample</td>
<td>Number that describes a population</td>
</tr>
<tr>
<td>Means: ( \bar{x} )</td>
<td>Means: ( \mu )</td>
</tr>
<tr>
<td>Proportion: ( p )</td>
<td>Proportion: ( p )</td>
</tr>
<tr>
<td>Standard Deviation: ( s )</td>
<td>Standard Deviation: ( \sigma )</td>
</tr>
</tbody>
</table>

**Sampling Distribution:**
Shows the statistic found in all possible samples of size \( n \)

**Population Distribution:**
Shows all individuals

**What was the real average for the Chapter 6 test?**

Highlight #4 for definition, we are going to do the check your understanding.
Unbiased Estimator:
A statistic is an unbiased estimator if the mean of the sampling distribution is equal to the true parameter.

Variability:
Increasing the sample size decreases the variability of the statistic.

Check your understanding:
The histogram on the left shows the interval (in minutes) between eruptions of the Old Faithful geyser for all 222 recorded eruptions during a particular month. For this population, the median is 73 minutes. We used technology to take 500 SRSs of size 10 from the population. The 500 values of the sample median are displayed in the histogram on the right. The mean of these 500 values is 73.5.

1.) Is the sample median an unbiased estimator of the population median? Justify your answer.

2.) Suppose we had taken samples of size 20 instead of size 10. Would the variability of the sampling distribution of the sample median be larger, smaller, or about the same? Justify your answer.

3.) Describe the shape of the sampling distribution of the sample median.

Coursework:
pg 428 # 1, 2, 6, 8, 16, 18, 21-24